

Description

INTEGRATED PIN AND CLIP

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of United States Provisional Application No. 60/481,045 filed June 30, 2003, the entire disclosure of which is hereby incorporated by reference.

BACKGROUND OF INVENTION

[0002] Many vehicles today are equipped to provide for towing trailers, campers, boats, or the like. Most vehicles are equipped with a receiver-type trailer hitch, wherein the trailer attaches to a hitch ball secured to a ball mount located on the back of the vehicle. Most vehicles do not have an integral hitch ball, but instead have a means for receiving a hitch ball onto the ball mount. Typically, these vehicles have a receiver or a tube that receives a draw-bar that has an integral or attachable hitch ball. The vehicle trailer receiver and draw bar have corresponding holes that align when the draw bar is fully attached. Once these

holes are aligned, a coupler pin can be placed through the corresponding holes, thereby securing the draw bar to the vehicle. The coupler pin may include a clip that can be moved such as to prevent withdrawal of the coupler pin. The non-inserted end of the coupler pin is designed to prevent further insertion of the coupler pin into the corresponding holes. This can be achieved by enlarging the non-inserted end, placing a larger portion on the non-inserted end, or bending the non-inserted end such that it cannot be inserted into the corresponding holes.

[0003] In the past, coupler pins have provided for a locking, or securing, means that prevents movement back to the position wherein the coupler pin can be removed. However, such coupler pins do not provide any other locking, or securing, means. As a consequence the installer must align the coupler clip with the holes and make sure that it does not move while the coupler pin is inserted into the trailer receiver. As such, there exists a need for an improved coupler pin that provides for easy application and removal of the coupler pin and can be secured in position once inserted into the trailer.

SUMMARY OF INVENTION

[0004] The present invention relates to an integrated pin and clip

for securing a ball mount to a receiver. The integrated pin and clip includes a locking member that can be secured in two different positions, a locked position and an unlocked position. The locking member is in the unlocked position when generally coaxial to the shaft of the integrated pin and clip and in the locked position when generally perpendicular to the shaft of the integrated pin and clip. The locking member is secured in each of those positions by a retention means, which requires force or movement in order to allow the clip to move to and from the locked and unlocked positions.

BRIEF DESCRIPTION OF DRAWINGS

- [0005] The present invention may be more readily understood by reference to the following drawings. While certain embodiments are shown as illustrative examples of the invention, the scope of this application should not be construed as limited to these illustrative examples.
- [0006] Fig. 1 is a perspective view of a first embodiment of an integrated pin and clip shown in the unlocked position.
- [0007] Fig. 2 is a view of the integrated pin and clip of Fig. 1 shown in the locked position.
- [0008] Fig. 3 is a perspective view of a second embodiment of an integrated pin and clip shown in the unlocked position.

- [0009] Fig. 4 is a perspective view of the integrated pin and clip of Fig. 3 shown in the locked position.
- [0010] Fig. 5 is a view of the integrated pin and clip of Fig. 1 shown with a sleeve adapter.
- [0011] Fig. 6 is a view of the integrated pin and clip of Fig. 3 shown with a sleeve adapter.
- [0012] Fig. 7 is a perspective view of a third embodiment of an integrated pin and clip shown in the unlocked position.
- [0013] Fig. 8 is a view of the integrated pin and clip of Fig. 7 shown in the locked position.
- [0014] Fig. 9 is a perspective view of a fourth embodiment of an integrated pin and clip shown in the unlocked position.
- [0015] Fig. 10 is a view of the integrated pin and clip of Fig. 9 shown in the locked position.
- [0016] Fig. 11 is a perspective view of a fifth embodiment of an integrated pin and clip shown in the unlocked position.
- [0017] Fig. 12 is a view of the integrated pin and clip of Fig. 11 shown in the locked position.
- [0018] Fig. 13 is a perspective view of a sixth embodiment of an integrated pin and clip shown in the unlocked position.
- [0019] Fig. 14 is a view of the integrated pin and clip of Fig. 13 shown in the locked position.
- [0020] Fig. 15 illustrates an integrated pin and clip in a locked

position and inserted through a receiver.

[0021] Fig. 16 illustrates a pin and clip assembly used in conjunction with a coupler.

DETAILED DESCRIPTION

[0022] The present invention is an integrated pin and clip, generally referred to as *10*. The integrated pin and clip *10* includes locking means, generally referred to as *20*, and a shaft member *25*. The locking means *20* is designed to have two distinct positions, a locked position and an unlocked position. When the locking means *20* is in the unlocked position, such as shown in Figs. 1, 3, 5, 7, 9, 11, and 13, the locking means is generally parallel to the shaft member *25* and allows insertion of the integrated pin and clip *10* into a hole in a receiver *30*. When the locking means *20* is in the locked position, such as shown in Figs. 2, 4, 6, 8, 10, and 12, the locking means is generally perpendicular to the shaft member *25* and does not allow the integrated pin and clip *10* to be removed from the receiver *30*. Figure 15 illustrated an embodiment of the integrated pin and clip *10* in the locked position on a receiver.

[0023] Each of the locked and unlocked positions include a retaining means that maintain the locking means *20* in the respective locked and unlocked, or neutral, positions. The

retaining means can include a number of mechanisms and is best described in the illustrative embodiments below. These embodiments are not meant to be limiting, but merely examples of illustrating the inventive concept described herein. Generally, the retaining means requires some additional force or movement of the locking means in order to move the locking means from the locked or unlocked position. As such, the pin will remain so positioned until the user provides for such force or movement, thereby avoiding accidental movement and allowing easy application of the integrated pin and clip.

[0024] The details of the present invention will now be described with reference to a number of illustrative embodiments. It should be appreciated by those skilled in the art that the present invention should not be limited to any of the particular embodiments disclosed herein, as modifications and combinations of the disclosed embodiments are contemplated by this application.

[0025] Figures 1–2 illustrate the first embodiment of the integrated pin and clip 10. The integrated pin and clip 10 is an angled piece of bar stock forming a shaft member 25 and a angled member 35, with a cutout portion 40 at the opposite end as the angled member. The cutout portion 40

generally includes three cut outs, located 90 degrees apart, in the general shape to receive the locking member 20. In this embodiment, the locking member is a clip 20a that is a cylindrical piece that can include indented regions 42 towards the middle of the clip to assist in gripping. The clip is spring-loaded to securely hold the clip against the shaft member 25. To operate the integrated pin and clip 10, the user pulls the spring-loaded locking clip into coaxial alignment with the shaft 25 and allows the locking clip to lock into engagement with the cut-out portion 40 located on the end 44 of the shaft 25. This position is shown in Figure 1. The user can then insert the integrated pin and clip 10 into the vehicle receiver, coupler or other device and the clip 20a will maintain coaxial alignment with the shaft member 25. The integrated pin and clip 10 is inserted through the receiver until the clip 20a is received through the opposite side of the receiver, as shown in Figure 15. The clip 20a can then be moved to a locking position, shown in Figure 2, by pulling the clip 20a from engagement with the cut-out portion 40 and rotating it 90 degrees in either direction. The clip 25 can then be released and the spring seats the clip in one of the locking cut-out portions along the sides 46 of the shaft member

25. The angled end 35 of the integrated pin and clip 10 prevents further insertion. To remove the integrated pin and clip 10, the clip 20a is moved into coaxial alignment with the shaft member 25, thereby allowing the integrated pin and clip 10 to be removed from the receiver.

[0026] Figures 3 and 4 illustrate a second embodiment of the integrated pin and clip 10. The integrated pin and clip 10 is an angled piece of bar stock forming a shaft member 25 and a angled member 35, with a cutout portion 40 at the opposite end as the angled member. The cutout portion 40 generally includes three cut outs, located 90 degrees apart, in the general shape to receive the locking member 20. In this embodiment, the locking member is a blade 20b. The locking blade 20b is generally a flat with rounded ends, and includes a slot 50 through which a pivot pin 52 is received. The locking blade 20b includes notches 55 on either side 56, as well as on the back side 57, for receiving spring-loaded ball bearings, or pins (not shown). To operate, the locking blade 20b is pulled outward away from the shaft member 25 to disengage the ball bearing from the back side notch 55. The locking blade 20b is then rotated ninety degrees in either direction and slid radially until one of the side notches 55 engage the spring-loaded

ball bearing. So positioned, the receiver is locked as the integrated pin and clip 10 cannot be further advanced nor removed from the receiver. To remove the integrated pin and clip 10, the locking blade 20b is slid radially and rotated to the unlocked position, where the locking blade 20b is generally coaxial to the shaft member 25. Once in the unlocked position, the spring-loaded ball bearing engages the notch 55 in the back side 57 of the locking blade 20b, thereby securing the locking blade 20b in the neutral or coaxial position. So positioned, the integrated pin and clip 10 can be removed from the receiver and the clip will not rotate.

[0027] One variation on the integrated pin and clip 10 shown in Figures 2 and 3 is to replace the indents 55 and slot 50 with a t-shaped slot (not shown). When the locking blade 20b is moved to the locked position, the ball bearing will push the locking blade 20b outward thereby sliding the pivot pin 52 into one of the "t"-extensions and securing the clip in the locked position.

[0028] Figures 7-8 illustrate a third embodiment of the integrated pin and clip 10. The integrated pin and clip 10 is an angled piece of bar stock forming a shaft member 25 and a angled member 35, with a cutout portion 40 at the op-

posite end as the angled member. The cutout portion 40 generally includes three cut outs, located 90 degrees apart, in the general shape to receive the locking member 20. In this embodiment, the locking member is a tweezer-like clip 20c. The clip 20c is a bent piece of sheet shock with notches 55 cut into the sides 56 and end 57. Typically the clip 20c is generally u-shaped, although other configurations are conceivable, with a slot 50 that engages a pivot pin 52. The notches 55 on the side and back are designed to engage a spring biased ball bearing, similar to that in Figures 3 and 4. As such, operation of the clip 20c is also similar to that of the embodiment in Figures 3 and 4. One modification that can be made to this embodiment is to replace the notches 55 with cutout sections (not shown) which interact with a stepped portion in the back of the cutout in the shaft member. The cutout portions engage the stepped portion when the clip is moved to the locked position. To operate, the clip 20c is compressed to move then ends from engagement with the stepped portion and then rotated ninety degrees in either direction. The clip 20c is then slid radially outward until the notches catch on the stepped portion, thereby locking the clip into position. To remove the integrated pin and clip

, the clip is compressed, thereby disengages the notches from the steps, slid radially, and then rotated to the coaxial, or neutral, position. Once in the neutral position, the ends of the clip *20c* engage the steps and prevent movement and the coupler pin can be removed from the receiver.

[0029] Figures 9–10 illustrate a third embodiment of the integrated pin and clip *10*. The integrated pin and clip *10* is an angled piece of bar stock forming a shaft member *25* and a angled member *35*, with a cutout portion *40 a* at the opposite end as the angled member. The cutout portion *40a* generally includes a portion taken from the shaft member *25* on opposite sides. In this embodiment, the locking member is u-shaped clip *20d* fastened about the central stem *70* of the integrated pin and clip end. The clip *20d* is generally u-shaped and connected to the integrated pin and clip *10* via a pivot pin *52* which is inserted through a slot *50* located on each of the u-shaped arms *72* of the clip *20d*. On the cut out portions *40a* of the integrated pin and clip *10* are generally flat with four (two on each flat portion) generally spherical detent-receiving cutouts *76*. The clip *20d* has two detents *78* located on either arm *72*, positioned such that the detents engage one set of the

detent-receiving cutouts 76 when the clip 20d is in the neutral or unlocked position and a second set of detent-receiving cutouts 76 when the clip 20d is in the locked position. As such, to operate the integrated pin and clip 10, the clip 20d is forced to disengage the first set of detents 78 from the first set of detent-receiving cutouts 78, thereby allowing the clip 20d to rotate ninety degrees in either direction. Once rotated ninety degrees, the clip 20d is slid radially until the second set of detents 76 is secured in the second set of detent-receiving cutouts 78. So positioned, the receiver is locked as the integrated pin and clip 10 cannot be further inserted or removed from the receiver. To remove the integrated pin and clip 10 from the receiver, the clip 20d is forced such that the second detents 76 disengage from the second set of detent-receiving cut-outs 78 and the clip 20d is slid radially and then rotated to the unlocked or neutral position. Once in the neutral position, the first set of detents 76 engage the first set of detent receiving cutouts 78, thereby securing the clip 20d coaxial to the pin. The integrated pin and clip 10 can thus be removed from the receiver and the clip 20d will not rotate.

[0030] A modification to this embodiment would be to switch the

locations of the detents 76 with the detent-receiving cut-outs 78. The integrated pin and clip 10 would operate in the same manner.

[0031] Another modification of this embodiment is shown in Figures 11–12. The clip 20e is generally u-shaped with a slot 50 formed by a tension arm 80. The clip slot 50 engages a pivot pin 50. The back side of the clip 20e includes a generally flattened portion 82 which provides resistance to the rotation of the clip 20e. To operate, the clip 20e is rotated ninety degrees and slid radially. As the clip 20e is slid, the pivot pin 52 applies pressure to the tension arm 80 until the pivot pin 50 is engaged by a set of notches 84 in the tension arm 80. The notches 84 allow the tension arm 80 to snap back into place, thereby secure the pivot pin 52 therein. So positioned, the coupler is locked as the integrated pin and clip 10 cannot be further inserted and the clip 20e prevents removal of the integrated pin and clip 10. To remove the integrated pin and clip 10, pressure is applied to the end of the clip 20e in the radial direction. The pressure allows the pivot pin 52 to advance from the notches 84 and thereby expand the tension arm 80. The clip 20e can then be move radially and then rotated to the unlocked or neutral position. Once in the unlocked posi-

tion, the integrated pin and clip 10 can be removed from the receiver and the clip 20e will not freely rotate.

[0032] Figures 13–14 illustrate a fourth embodiment of the integrated pin and clip 10. The integrated pin and clip 10 is an angled piece of bar stock forming a shaft member 25 and a angled member 35, with a cutout portion 40 a at the opposite end as the angled member. The cutout portion 40a generally includes a portion taken from the shaft member 25 on opposite sides. In this embodiment, the locking member is a slide clip 20f. The clip 20f is generally u-shaped with a base side 90 connecting the u-shaped arms 92. Optionally, the back 93 of the clip 20f can be closed as well. The clip 20f includes notches on each of the u-shaped arms that receive a pivot pin. The clip 20f includes a flattened end portion 94 that prevents rotation from the unlocked position. The integrated pin and clip 10 operates in a similar manner as the above embodiments, and any of the mentioned retention means can be added to assist in securing the clip 20f in the locked position.

[0033] Figures 5 and 6 illustrate an adapter sleeve 100 that can be used in conjunction with any of the embodiments mentioned herein. The adapter sleeve 100 generally slides over the shaft member 25 and provides for an increased

diameter. Furthermore, nubs *105* can be added to the shaft *25* to prevent the adapter sleeve *100* from sliding axially along the shaft member.

[0034] Figure 16 illustrates another embodiment of the present invention, specifically an integrated pin and clip *10* that is used in conjunction with a coupler *108*. The integrated pin and clip *10* is inserted into the coupler latch *108* to prevent the uncoupling of the coupler *108* from the hitch ball (not shown). The integrated pin and clip *10* may include a chain *110* that allows the integrated pin and clip *10* from becoming detached from the coupler *108*.

[0035] Each of the embodiments disclosed herein are disclosed as illustrative embodiments of the present invention. Modifications of these embodiments are contemplated and included in this application. For example, the rotation of the clip ninety degrees can be in any orientation relative to the bent portion of the coupler pin. In other embodiments the coupler pin need not be bent, but instead may include a stop section that is larger than the coupler holes, such as to prevent further insertion of the pin. In other embodiments, detents can be replaced with spring-loaded ball bearings or pins. In still other embodiments, the locking clip can take other shapes or configurations

such that it maintains the advantages disclosed in this application. It should be noted the orientation of the locking member 20 rotation, the angle of the angled portion 35, and the nubs 105 are shown merely as one particular set of embodiments. As such, any of these orientations can be modified from that which is shown and still achieve the invention as set forth herein.